## SEQUENCE LISTING

]	Jørgensen, Steen Troels Rasmussen, Michael Dolberg Andersen, Jens Tønne Olsen, Carsten	
<120>	Multiple insertion of genes	
<1,30>	10022.204-US	
<160>	50	
<170>	PatentIn version 3.1	
<212>	1 30 DNA Artificial Sequence	
<220> <223>	Primer	
<400> gactaa	1 gctt ctgcatagtg agagaagacg	30
<210> <211> <212> <213>	67	
<220> <223>	Primer	
<400> gactga	2 matto agatotgogg cogoaogogt gtogacagta otgaaataga ggaaaaaata	60
agtttt	co	67
<210> <211> <212> <213>	33 DNA	
<220> <223>	Primer	
<400> gactg	3 aattc cgtatccatt cctgcgatat gag	33
<210><211><211><212><213>	41	

<220> <223>	Primer	
<400> gactgga	4 atoc agatottatt acaacootga tgaatttgto g	41
<210> <211>		
<212>		
<220>		
<223>	Primer	
<400> gactgg	5 atcc agatctgcta gcatcgatcc gcggctattt ccattgaaag cgattaattg	60
<210>	6	
<211> <212>	31 DNA	
	Artificial Sequence	
<220> <223>	Primer	
	6 ccga gattctgtta tcgactcgct c	31
<210>	7	
<211>		
<212> <213>	DNA Artificial Sequence	
<220>		
<223>	Primer	
<400> gttttc	7 :ggcc gctgtccgtt cgtcttt	27
1010		
<210> <211>	8 27	
<212>	DNA	
<213>		
<220>	Pudman	
<223>	Primer	
	8	2
gtgtga	acgga taaggccgcc gtcattg	
<210>	9	
<211> <212>		
ヘ乙エ乙>	DNA	

213> Artificial Sequence	
220> 223> Primer	
400> 9 tcttgtctc ggagcctgca ttttgggg	28
210> 10 211> 26 212> DNA 213> Artificial Sequence	
220> 223> Primer	
400> 10 gcattattc ttcgaagtcg cattgg	26
210> 11 211> 45 212> DNA 213> Artificial Sequence	
220> 223> Primer	
400> 11 taagatett ttttataeaa ataggettaa eaataaagta aatee	45
210> 12 211> 3342 212> DNA 213> Bacillus licheniformis	
220> 221> CDS 222> (1303)(2469) 223> DNA sequence of the dal-gene encoding D-alanine racemase	
220> 221> misc_feature 222> (2685)(2685) 223> n denotes an undetermined nucleotide	
400> 12 cgtaccgtt aaagtcgaac agcggtttct teetttttae atccatggat taaaaagggg	60
tgaaaaaag gtgagaaaaa gctttgtttt gcttttaacg gggctgcatg taatccttat 1	120
ctttctgcc tgcggccaaa aatcgcaaga agatgttgtg acggggctcg acaagaaggc 1	180
aaagaatac acgtcctata aggcaaaagc gaaaatgacc attgaaacgg ggaatgaccc 2	240

					200
				ctttaccggg tctatttgga	300
aaacccgaaa	aaagaccaga	gccaggtgat	cttgcgcaat	gaaaacggcg tgtttgtttt	360
gactccgtcg	ctgaataaaa	gcttccgctt	tcacagcgac	tggcccaata acagcagcca	420
ggtatactta	ttcgaatcgc	tcgtaaagga	tgtcaaaaat	gatggggaag cttcttttc	480
cgcaaaggat	tcaaaataca	tttttgaaac	gaaaacgaat	tatcagcata atcagatgct	540
gccgactcag	gaaatcgttt	tccataaaaa	gaccatggct	ccttcatcgg ttaaagtgat	600
ggataccgac	cgcaaaccga	tggtaaaggt	tgagtttaca	agctttgaat tcgataagcc	660
gctcgataaa	gactcttttg	atgaaaagaa	aaatatgacg	ctgtctcaaa ttgacgtagc	720
gacaagcgct	gacgtgtcag	actctttcgc	: tgtcaaaacg	ccgctcgatg tgcctcaggg	780
cgtgaaaaag	cttgaagaga	aagagatggo	: gactgaagac	ggcaaacgga tcgtcatcac	840
atatggcggt	gaaaaatcct	ttacattgat	: tcaggaaaaa	gecegegteg ceaaaacate	900
cacttccgta	tccatgaac	g gagagcccgt	tgacctcggc	ttcacggtcg gcgcactgac	960
ggataaatcg	ttgtcatgga	a catatgacgo	g agtcgattac	: tttatctcat cagaagatct	1020
ttctcaagat	gaacttctg	a tggttgcaaa	a aagcatgcag	ggacagtctt cgaaatagac	1080
tgtgccgtat	ccggcagcc	t gttttccgc	c cggaagcgga	a aagcaggctt ttttatattt	1140
gcgtcgcaag	cgtatgatt	t cgacagctti	tccgtaaaat	gtataccgtg ccagcaattt	1200
				tttctccgaa ctttttagta	1260
tgatgggaag	gacgagtga	a acaaggaac	a ggaagtgtca	tg atg agc tta aaa	1314
				Met Ser Leu Lys 1	
cca ttc ta Pro Phe Ty 5	r Arg Lys	aca tgg gcc Thr Trp Ala 10	gaa atc gat Glu Ile Asp 15	tta acg gct tta aaa Leu Thr Ala Leu Lys 20	1362
gaa aac gt	c cgc aat	atg aag cgg	cac atc gg	e gag cat gtc cgc ctg	1410
Glu Asn Va	al Arg Asn 25	Met Lys Arg	His Ile GL	y Glu His Val Arg Leu 35	
atg gcc g Met Ala Va	tc gtt aaa al Val Lys 40	gcg aat gcc Ala Asn Ala	tac gga ca Tyr Gly Hi 45	c ggg gat gca cag gta s Gly Asp Ala Gln Val 50	1458
gcg aag go Ala Lys A	la Ala Leu	gca gaa ggg Ala Glu Gly 60	gcg tcc at Ala Ser Il	t ctt gct gtg gct tta e Leu Ala Val Ala Leu 65	1506
ttg gat g Leu Asp G 70	aa gcg ctt lu Ala Leu	tcg ctg agg Ser Leu Arg 75	gcg cag gg Ala Gln Gl	g att gaa gaa ccg att y Ile Glu Glu Pro Ile 80	1554

ctt Leu 85	gtc Val	ctc Leu	ggt Gly	gca Ala	gtg Val 90	ccg Pro	acc Thr	gaa Glu	tat Tyr	gca Ala 95	agc Ser	att Ile	gcc Ala	gcg Ala	gaa Glu 100	1602	3
aag Lys	cgc Arg	att Ile	atc Ile	gtg Val 105	act Thr	ggc Gly	tac Tyr	tcc Ser	gtc Val 110	ggc Gly	tgg Trp	ctg Leu	aaa Lys	gac Asp 115	gtg Val	1650	)
ctc Leu	ggt Gly	ttt Phe	ctg Leu 120	aat Asn	gag Glu	gcc Ala	gaa Glu	gct Ala 125	cct Pro	ctt Leu	gaa Glu	tat Tyr	cat His 130	ttg Leu	aag Lys	1698	3
atc Ile	gac Asp	acg Thr 135	ggc Gly	atg Met	ggc Gly	cgc Arg	ctt Leu 140	ggc Gly	tgc Cys	aaa Lys	acg Thr	gaa Glu 145	gaa Glu	gag Glu	atc Ile	1740	6
aaa Lys	gaa Glu 150	atg Met	atg Met	gag Glu	atg Met	acc Thr 155	gaa Glu	tcg Ser	aac Asn	gat Asp	aag Lys 160	ctc Leu	aat Asn	tgt Cys	acg Thr	179	4
ggc Gly 165	gtg Val	ttc Phe	act Thr	cat His	ttc Phe 170	gcc Ala	acg Thr	gcg Ala	gac Asp	gaa Glu 175	aag Lys	gac Asp	acc Thr	gat Asp	tat Tyr 180	1842	2
ttc Phe	aac Asn	atg Met	cat His	ctt Leu 185	gac Asp	cgc Arg	ttt Phe	aaa Lys	gag Glu 190	ctg Leu	atc Ile	agc Ser	ccc Pro	ttc Phe 195	ccg Pro	1890	)
ctt Leu	gac Asp	cgt Arg	ttg Leu 200	atg Met	gtg Val	cat His	tcg Ser	tca Ser 205	aac Asn	agc Ser	gcc Ala	gcg Ala	ggt Gly 210	ctg Leu	cgc Arg	193	8
ttc Phe	agg Arg	gaa Glu 215	cag Gln	cta Leu	ttt Phe	aat Asn	gcc Ala 220	gtc Val	cgc Arg	ttc Phe	ggc Gly	atc Ile 225	ggc Gly	atg Met	tac Tyr	198	6
ggt Gly	ttg Leu 230	gcg Ala	ccg Pro	tca Ser	acc Thr	gaa Glu 235	ata Ile	aaa Lys	gac Asp	gag Glu	ctg Leu 240	ccg Pro	ttt Phe	cgt Arg	ctg Leu	203	4
cgg Arg 245	gaa Glu	gtg Val	ttt Phe	tcg Ser	ctt Leu 250	cat His	acc Thr	gaa Glu	ctc Leu	acc Thr 255	cat His	gtg Val	aaa Lys	aaa Lys	att Ile 260	208	2
aaa Lys	aaa Lys	ggc Gly	gag Glu	agc Ser 265	gtc Val	agc Ser	tac Tyr	ggg Gly	ġcg Ala 270	aca Thr	tat Tyr	aca Thr	gct Ala	cag Gln 275	cgc Arg	213	0
gac Asp	gaa Glu	tgg Trp	atc Ile 280	ggg Gly	aca Thr	gtc Val	ccc Pro	gtc Val 285	ggg	tat Tyr	gcc Ala	gac Asp	gga Gly 290	tgg Trp	ctg Leu	217	8
agg Arg	cgc Arg	ctg Leu 295	gcc Ala	gga Gly	acg Thr	gaa Glu	gtg Val 300	ctg Leu	atc Ile	gac Asp	gga Gly	aaa Lys 305	cgc Arg	caa Gln	aaa Lys	222	6
ata	gca	ggg	aga	atc	tgc	atg	gac	cag	ttc	atg	att	tcc	ctt	gcc	gaa	227	4

Ile Ala Gly Arg Ile Cys Met Asp Gln Phe Met Ile Ser Leu Ala Glu 310 315 320	
gaa tac cct gtc ggc aca aag gtt acc ttg atc gga aag caa aaa gac Glu Tyr Pro Val Gly Thr Lys Val Thr Leu Ile Gly Lys Gln Lys Asp 325 330 335 340	2322
gaa tgg atc tca gtc gac gaa atc gcc caa aat ttg cag acg atc aat Glu Trp Ile Ser Val Asp Glu Ile Ala Gln Asn Leu Gln Thr Ile Asn 345 350 355	2370
tat gaa att acc tgt atg ata agt tca agg gtg ccc cgt atg ttt ttg Tyr Glu Ile Thr Cys Met Ile Ser Ser Arg Val Pro Arg Met Phe Leu 360 365 370	2418
gaa aat ggg agt ata atg gaa ata agg aat ccg atc ttg cct gat caa Glu Asn Gly Ser Ile Met Glu Ile Arg Asn Pro Ile Leu Pro Asp Gln 375 380 385	2466
toc tgaaaattga tgaattagog gaaaaacaao tttgottgog aaaagaataa Ser	2519
tgatatgatt atgaatggaa tggatagagt gttgtatccg taagtttggt ggaggtgtat	2579
gtttttgtct gaatccagcg caacaactga aatattgatt cgcttgccag aagctttagt	2639
atcagaactg gatggtgtcg tcatgcgaga taaccgggag cagganatga actgatttta	2699
ccaagccaca aaaatgtagg aacgcgaacg caaaaaatcg acaaattcgg ggaatcgatg	2759
agaagcggtt atatggagat ggccaagatc caatttgaac atctcttctg aggctcaatt	2819
tgcagagtat gaggctgaaa acacagtaga gcgcttacta agcggatgat aatcatttga	2879
ttgttaaacg cggcgatgtt tattttgctg acctatctcc tgttgttggc tcagaacaag	2939
gcggggtgcg cccggtttta gtgattcaaa acaacatcgg caatcgcttc agcccaactg	2999
ctattgttgc agccataaca gcccaaatac agaaagcaaa attacctacc cacgtcgaaa	3059
ttgatgcgaa acgctacggt tttgaaagag actccgttat attgctcgaa caaattcgga	3119
cgattgacaa gcaaagatta acggacaaaa tcacccatct cgatgatgaa atgatggaaa	3179
aggtcaacga agccttacaa atcagtttgg cactcattga tttttaatat tgatgaaagt	3239
	0203
tgctcgaggc gaaagagcaa ctttttttgt gttcaaaaat aacaatacga tataatggta	3299

<sup>&</sup>lt;210> <211> <212> <213>

<220>

<sup>13</sup> 389 PRT Bacillus licheniformis

<221> misc\_feature

 $\langle 222 \rangle$   $(268\overline{5})...(2685)$ 

<223> n denotes an undetermined nucleotide

<400> 13

Met Ser Leu Lys Pro Phe Tyr Arg Lys Thr Trp Ala Glu Ile Asp Leu  $1 \hspace{1.5cm} 5 \hspace{1.5cm} 10 \hspace{1.5cm} 15$ 

Thr Ala Leu Lys Glu Asn Val Arg Asn Met Lys Arg His Ile Gly Glu 20 25 30

His Val Arg Leu Met Ala Val Val Lys Ala Asn Ala Tyr Gly His Gly 35 40 45

Asp Ala Gln Val Ala Lys Ala Ala Leu Ala Glu Gly Ala Ser Ile Leu 50 55 60

Ala Val Ala Leu Leu Asp Glu Ala Leu Ser Leu Arg Ala Gln Gly Ile
65 70 75 80

Glu Glu Pro Ile Leu Val Leu Gly Ala Val Pro Thr Glu Tyr Ala Ser 85 90 95

Ile Ala Ala Glu Lys Arg Ile Ile Val Thr Gly Tyr Ser Val Gly Trp  $100 \hspace{1.5cm} 105 \hspace{1.5cm} 110 \hspace{1.5cm}$ 

Leu Lys Asp Val Leu Gly Phe Leu Asn Glu Ala Glu Ala Pro Leu Glu 115 120 125

Tyr His Leu Lys Ile Asp Thr Gly Met Gly Arg Leu Gly Cys Lys Thr 130 135 140

Glu Glu Glu Ile Lys Glu Met Met Glu Met Thr Glu Ser Asn Asp Lys 150 155 160

Leu Asn Cys Thr Gly Val Phe Thr His Phe Ala Thr Ala Asp Glu Lys \$165\$ \$170\$ \$175\$

Asp Thr Asp Tyr Phe Asn Met His Leu Asp Arg Phe Lys Glu Leu Ile 180 185 190

Ser Pro Phe Pro Leu Asp Arg Leu Met Val His Ser Ser Asn Ser Ala 195 200 205

Ala	Gly	Leu	Arg	Phe	Arg	Glu	Gln	Leu	Phe	Asn	Ala	Val	Arg	Phe	Gly
	210		_			215					220				

Ile Gly Met Tyr Gly Leu Ala Pro Ser Thr Glu Ile Lys Asp Glu Leu 225 230 235 240

Pro Phe Arg Leu Arg Glu Val Phe Ser Leu His Thr Glu Leu Thr His  $245 \hspace{1.5cm} 250 \hspace{1.5cm} 255$ 

Val Lys Lys Ile Lys Lys Gly Glu Ser Val Ser Tyr Gly Ala Thr Tyr 260 265 270

Thr Ala Gln Arg Asp Glu Trp Ile Gly Thr Val Pro Val Gly Tyr Ala 275 280 285

Asp Gly Trp Leu Arg Arg Leu Ala Gly Thr Glu Val Leu Ile Asp Gly 290 295 300

Lys Arg Gln Lys Ile Ala Gly Arg Ile Cys Met Asp Gln Phe Met Ile 305 310 315 320

Ser Leu Ala Glu Glu Tyr Pro Val Gly Thr Lys Val Thr Leu Ile Gly 325 330 335

Gln Thr Ile Asn Tyr Glu Ile Thr Cys Met Ile Ser Ser Arg Val Pro  $355 \hspace{1.5cm} 360 \hspace{1.5cm} 365$ 

Arg Met Phe Leu Glu Asn Gly Ser Ile Met Glu Ile Arg Asn Pro Ile 370 375 380

Leu Pro Asp Gln Ser 385

<210> 14

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 14

gatgaacttc tgatggttgc

20

<210> <211> <212>		
	Artificial Sequence	
<220> <223>	Primer	
	15 tccc cctgactaca tctggc	26
<210><211><211><212><213>	39	
<220> <223>	Primer	
<400> aaagcg	16 gccg cgagactgtg acggatgaat tgaaaaagc	39
<210> <211> <212> <213>	32	
<220> <223>	Primer	
<400> aaagaa	17 ttcg tgaaatcagc tggactaaaa gg	32
<210><211><212><212><213>	32	
<220> <223>	Primer	
<400> aaagga	18 tccc gcaagcaaag ttgtttttcc gc	32
<210> <211> <212> <213>	30	
<220> <223>	Primer	

	<400>		30
	aaaggt	accg aaagacatgg gccgaaatcg	50
	<210>	20	
	<211>	32	
	<212>		
	<213>	Artificial Sequence	
	<220>		
	<223>	Primer	
		20	32
	aaaggt	accg gtaatgactc tctagcttga gg	
	-0105	0.1	
	<210>	21	
12.	<211>		
ær ₹1.	<212>		
,	<213>	Artificial Sequence	
Asser 21 Borth Boss Apal Back Back	4000		
\$2 22 23 24 24 24 24 24 24 24 24 24 24 24 24 24	<220>	Primer	
F.	<223>	LITHET	
	<400>	21	
=: =:		cgatc atcaccgaaa cgcggcaggc agc	33
	Caaacc	gato acodocyana ogogy-myy- y	
49			
No.	<210>	22	
j	<211>		
	<212>		
3.		Artificial Sequence	
ž.	(210)		
	<220>		
= <del>7</del> =	<223>	Primer	
<b>P</b> 0	1220		
	<400>	22	2.4
		gcttg atatgattat gaatggaatg g	31
	<210>	23	
	<211>	30	
	<212>		
	<213>		
	<220>		
	<223>	Primer	
	<400>	23	30
	aaagc	tagca tececetgae tacatetgge	)(
	<210>		
	<211>		
		DNA	
	<213>	Artificial Sequence	
	<220>	,	

<223>	Prim	er					
	24 cgtt	aaagtcgaac a	agcg				24
<210> <211> <212> <213>	25 30 DNA Arti	ficial Sequ	ence				
<220> <223>	Prim	er					
<400> aaagcta	25 agca	tccccctgac	tacatctggc				30
<210> <211> <212> <213>	26 5761 DNA Baci	.llus lichen	iformis				
<400> accggg	26 gccg	ggcgttttgt	cggcaacgtc	tgtatatttc	agccttgaaa	ggcccttgat	60
tccttc	atgg	atgatcgctt	tcataaaaaa	attcccccca	ttcgagttgg	ttgtgttaaa	120
ttatgg	acat	gaatgaaggt	aaatgtaaaa	tgatttgccc	ggggccgctt	agaggccttc	180
tgtttt	ataa	aggattgcaa	tgaggcggaa	attccattag	tgtaatacag	aagcaagcta	240
		gagatggaac					300
atatga	.agca	gttcgataca	ttcctggaca	gcccttttc	atacggggtg	ctgcttgaca	360
tccatc	ttgg	acagctggga	ggcgtgatca	gcgcggcaag	atcccatggg	aaaaaaatgt	420
ttgttc	acgt	cgatctgatc	caaggaatta	agcatgatga	atacggtgcg	gaattcattt	480
gccagg	gaaat	gaaaccggcg	ggcattcttt	ctacgagatc	aagcgttatc	gccaaagcaa	540
agcaga	agaa	agtgtatgcg	atccagcgca	tgtttttaat	agacacaagc	gccatgaaga	600
		attggtgaaa					660
tgccgg	gaatt	gatcagggaa	gtcaaagaaa	taaccggcat	tccgatcttt	gcgggcgggt	720
ttatco	cgtac	cgaaaaagac	gtcgagcagg	cgcttgcagc	aggggcgtcc	gcagtcacca	780
		tgatttatgg					840
		tttcactata					900
		agcagttctt					960
		gacacagtgg					1020

1080 tcataataga ttttaggagg gatagccttg acagcatttt ggggggaagt tatcggaacg atgctgctca tcgtctttgg agctggagtt tgtgcaggag ttaatttgaa aaaatcgctg 1140 1200 toccatcaat coggatggat tgtgatcgtc ttcggctggg ggcttggcgt ggccatggcg gtatatgccg tcggcggcat cagcggagcg catttaaatc cggccgttac attggggctg 1260 gcatttgtcg gagattttcc ttgggaagaa gtgccttcat atattttggg acagatgatc 1320 ggcgcatttt taggagcggt gctcgttttt cttcactact tgccgcactg gaaagaaacc 1380 gaggatcaag gcgcgaagct tggagtattt tcgacaggtc cggcgattcc aaatacattt 1440 gcaaacctgt tcagtgaaac attggggact tttattctcg ttctcggact tttaacgatc 1500 1560 ggtgcaaaca agtttactga cggactgaat cctcttgttg tcggatttct gatcgtggcg atcggtatct cgctcggcgg aacaacaggc tatgcgatta accetgcccg cgatctgggg 1620 1680 ccgagaattg cccattttgt ccttccgatt gcaggcaaag ggagttcaaa ctggaagtac gcgtggatcc ctgttttagg accggcgctt ggcggttcat ttgcaggcgt tttttacaac 1740 1800 gccgtattca aagggcatat cacaaacaca ttttggattg taagcgttat actagttgtg 1860 atattgttag gtttctatat tcatatgaaa aaacaagcag ttgatcaatc ggtcaacatt taaaaaaaag caatcttaac agacatataa gggggagttt caaaatggaa aagtacattt 1920 tgtctcttga tcaaggcacc acaagcacaa gggcgattgt tttcaacaaa gcaggcgaaa 1980 tcgtccatat tgcgcaaaag gaattccagc aatattttcc aaaccccggc tgggttgaac 2040 acaatgcaaa cgaaatctgg ggctctgttc tgtcggtgat cgcttcagcg ctttcagaat 2100 2160 cggggatcga agccggacaa attgccggaa tcgggatcac aaaccagcgg gaaacgaccg 2220 tggtttggga taaacatacc ggcaaaccgg tctacaacgc gattgtgtgg cagtcccgcc 2280 aatcggctga gatatgccag gaattaaaag agaaaggcta tgaagagacg atcagagaaa 2340 aaacagggct tttaatcgat ccttattttt caggcacgaa agtgaaatgg atcctggatc atgtggaagg ggcaagggag aaagccgaaa acggcgacct tctcttcggt acgatcgatt 2400 2460 cttggctgat ctggaaaatg tccggcggaa aagcgcatgt gacagattat tcaaacgcct 2520 caagaacatt gatgttcaac atctatgacc taaaatggga tgatgaactt ctcgatattc 2580 teggegtgee gaaategatg gtteeggaag teaageette ategeatgta taegetgaaa cggtcgatta tcatttcttc ggcaaaaaca ttccgattgc aggtgcagcc ggcgaccagc 2640 2700 aggcagcatt gttcgggcag gcttgctttg aagaaggaat ggttaagaac acgtatggaa 2760 caggetgett tatgetgatg aacaceggeg agaaagegat taaatcagag caeggeetge

2820 tgacgacaat cgcttggggc atcgacggaa aggtggaata tgcgctggaa ggcagcgtct 2880 tcgtcgcggg ttccgctatt caatggctgc gtgatgggct gagaatgttt aaagacgcca 2940 aagaaagtga aaaatacgct gtaagagcag aatctgccga tggtgtttat gtggtccctg catttgtagg tttaggcacg ccttattggg acagcgatgt ccgcggcgct gtattcggac 3000 tgacccgggg tacgacgaaa gagcatttta tcagagcaac gcttgaagcg cttgcctatc 3060 aaacgaaaga cgtgctggac gcaatgaagg aagactccgg gatcccggtt aaaacgctga 3120 3180 gagtcgacgg cggagctgtc aaaaacaact tcctgatgga ttttcagggc gacattttag atgtccctgt agaacgtcct gaaatcaatg aaacaacagc gcttggttca gcctatttag 3240 cgggccttgc tgtcggcttc tggagcgatc gttccgagat caaagaccag tggcagcttg 3300 3360 acaaacgttt tgaaccgaaa atggaagaaa aagagcgtga gagcctgtac aacgggtgga 3420 agaaagctgt aaatgcagct agggctttta aataagctgc atgtatgtta caatctaatt 3480 aagttaatag aaacggttgg agaagaggag agaccgcaga caccaaagca gtatcagcgc 3540 tttggatgtt tgtggtctct ttttctattt tttaccgtga caacaaggga ggacatgaaa 3600 catggaatca ttattttcaa gccgtaaacg ggacgacatt ttacagaata tgacgaagca 3660 gaagtatgac gtgtttatta tcggcggagg tattactggg gctgggacgg cattggatgc cgcatcgcgc ggaatgaaaa cggcgctttg cgaaatgcag gactttgcag ccggaacgtc 3720 aagccgttcc acgaaacttg tacacggcgg gcttcgctat ttaaagcaat ttgaagtgaa 3780 aatggtagcc gaggtcggca aagagcgggc gatcgtctat gaaaacgggc cgcacgttac 3840 3900 aacgcccgaa tggatgctgc ttccgatgca taagggaggg actttcggca aattcagcac 3960 ttcaatcgga ctgagggtgt acgacttttt ggcaggcgtc aaaaaagctg agcggaggag 4020 catgctgact gccgaagaaa cgcttcaaaa agagccgctc gtgaaaaaga acggcctgaa 4080 gggcggcggc tattatgtcg aataccggac ggatgatgcc agattgacga tcgaagtcat 4140 gaaagaagcc gttaaattcg gagccgaggc cgtcaattat gcaaaagtaa gcgattttat atatgaaaac ggcaaggtca ccggcgtggt cattgaagac gtcttcacga aaaaaacgta 4200 4260 ccgcgtctac gcgaaaaaaa ttgtcaatgc cgcggggccg tgggtcgacc gtctgcggga 4320 aaaagaccat tcaaaagaag gcaaacacct tcagcataca aaaggcgtgc atcttgtttt tgatcaatcg gtctttcctt taaaacaagc cgtttatttt gatacgcctg acggccgcat 4380 ggtgttcgcc attccgagag acggaaaggc atatgtcggc acaacagaca ccgtctacaa 4440 cgagaatttg gaacaccctc gaatgacgac agcagacagg gattatgtca tcaatgcaat 4500

caactatatg	ttccctgaac	ttggaatcaa	agccgaagat	gtcgaatcaa	gctgggctgg	4560
cctcagaccg	ctgattcatg	aagaaggaaa	agacccgtcc	gagatttccc	gaaaagatga	4620
gatctggact	tctgaatccg	gactgatcac	gatcgccggc	ggaaagctga	caggctacag	4680
aaaaatggct	gagcatatcg	tcgatcttgt	cagagaccga	ttaaaagaag	agggcgacag	4740
agacttcggg	ccttgcagaa	caaaaacgat	gccgatttca	ggcggccata	tcggcggctc	4800
caaaaatctg	gaggctttta	ttcaagcgaa	agcagccgaa	gggattgagg	ccggactgtc	4860
cgaagagacg	gccaaacaaa	tegeegeaeg	atacggttcg	aacgcagacc	gcctgtttga	4920
tcgtattcca	tcgctgaaag	atgaagcagc	aaaacgccgc	atccctgtcc	atgtactagc	4980
agaaatggat	tacgggatcg	aggaagaaat	ggcagccgtc	ccggcagact	tcttcgtccg	5040
cagaaccggt	gcgctgttct	ttgacatcaa	ttgggtccgc	acttacaaag	agagccttac	5100
ggactacatg	agcgagaagc	tgaactggga	tggcgaaacg	aaggcccggc	atgtcaaggc	5160
attggaagga	ctactacacg	atgctgttgt	cccgctggaa	agcaaatgat	ttattaggtc	5220
aaataacctt	ggtgaatttt	cgttaataat	caatcgaatg	gcccggcgtg	aggctgtctt	5280
gaacaggcag	cctcattttt	ttcatttggc	atgctaaatt	tggacaaagc	ggcggtttgt	5340
cgatatgata	aaagaaaagc	tgcaattact	tagctagaac	attggaggta	atcatgagct	5400
ggagaacgag	ctatgaacgc	tggagaaaca	aagaaaactt	agattccgaa	ttaaaagcgc	5460
ttcttttgga	agcggaagga	aatgaaaaag	aactagagga	ttgcttttat	aaaaaacttg	5520
agtttggtac	agccggtatg	cgcggtgaga	tcggaccggg	cccgaaccgc	atgaacgttt	5580
atacggttcg	caaagcatcg	gcgggccttg	ccgcatacat	aggagcgaac	ggcggcgaag	5640
caaaaaagcg	cggcgttgtg	atcgcgtacg	attcccgcca	caaatcgcct	gaatttgcaa	5700
tggaagctgc	taagacgctc	gcagaaaacg	gcgttcaaac	gtacgtgttt	gagcgtaact	5760
g						5761

<210> 27

<211> 34

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer

<400> 27

gactgaattc gcaatttgaa gtgaaaatgg tagc

<210> 28

34

	DNA Artificial Sequence	
<220> <223>	Primer	
<400> gactgga	28 atcc agatctcatc ttttcgggaa atc	33
<210> <211> <212> <213>	29 56 DNA Artificial Sequence	
<220> <223>	Primer	
	29 attc agatctgcgg cegcaegegt agtaeteeeg gegtgagget gtettg	56
<211> <212>		
<220> <223>	Primer	
	30 gctt cagttacgct caaacacgta cg	32
<210><211><211><212><213>	31 47 DNA Artificial Sequence	
<220> <223>	Primer	
<400> ccgaga	31 tttc ccgaaaagat gaaatttgga cttctgaatc cggactg	47
<210><211><211><212><213>	50	
<220> <223>	Primer	
<400>	32 gett agatetgeta geategattg attattaaeg aaaatteaee	50

	33 31 DNA	
<213> <220>	Artificial Sequence	
	Primer	
<400> gactaa	33 gctt gtgaaggaga tggaacatga g	31
<212>	34 64 DNA Artificial Sequence	
<220> <223>	Primer	
<400> gactgg	34 atoc agatotgogg cogoacgogt ogacagtact atttttagtt coagtatttt	60
ttcc		64
<211> <212>	35 32 DNA Artificial Sequence	
<220> <223>	Primer	
<400> gagctc	35 taga tetteggegg cateagegga ge	32
<210><211><211><212><213>	36 28 DNA Artificial Sequence	
<220> <223>	Primer	
<400> gactga	36 attc cttttgcgca atatggac	28
<210> <211> <212> <213>	37 58 DNA Artificial Sequence	
<220> <223>	Primer	

<400> 37 gagctctaga	tctgctagca	tcgatccgcg	gttaaaatgt	gaaaaattat	tgacaacg	58
<210> 38 <211> 1500 <212> DNA <213> Baci	llus licher	niformis				
<400> 38 atcagcgata	gggctcgcat	cgacagaccg	gatttcatcc	ggccaatggc	gggatgacgg	60
gctggtcatc	aggtcgacat	ccggcgatca	gtttaatgcc	attgaccctg	atctggtcat	120
tgacaaagac	ggaaagccct	ggctctcatt	cggttccttc	tggagcggca	ttaagctgac	180
aaggcttgat	aaaaacacga	tgaaaccgac	gggaagcctg	tattcgatcg	cctcaaggcc	240
gaataacgga	ggagcggttg	aagccccgaa	cattacctac	aaagacggct	actattactt	300
att <u>tgtctcg</u>	tttgacagct	gctgcaaagg	ggtggacagc	acatataaaa	tagcctatgg	360
ccgttcaacg	agcattacgg	gaccctatta	tgataaaagc	ggcaaaaata	tgatgaacgg	420
cggagggacg	atcctggact	ccggcaatga	ccgctggaaa	gggccgggac	atcaggatgt	480
tctgaacaac	tcgatccttg	tcaggcatgc	ttacgacgcg	ctggacaatg	gtgtatcaaa	540
gctgctcatc	aatgacttgt	actgggattc	ccaaggatgg	ccgacttatt	aacagcagat	600
gacgggcggt	ttccgcccgg	ttttttttgt	tctgaaatct	gtcaaaaaaa	aataaaaaac	660
ataccggaaa	ttaaattgac	agttttttc	ataatgatat	aatgaagttg	ttcgtacaaa	720
tatgttttt	atgttagttg	tacgtacata	taatcgcgat	acagtttgag	atcaaggtat	780
gatttatgtt	tttttgtaag	cgttttaata	gtttgctatt	ctacacagac	accataaaga	840
cgaggaggag	gaagctattt	gattcaggca	aagacgcatg	tgttttggtt	tgtgacaggc	900
agccagcatt	tatatggcga	agaggcggta	caagaggtag	aagagcattc	caaaatgatc	960
tgcaacggat	taaatgacgg	agatttaagg	tttcaagtcg	agtacaaagc	ggtggccact	1020
tcgctggacg	gcgtcagaaa	actgtttgaa	gaggcgaacc	gggacgatga	gtgcgcaggc	1080
atcatcacct	ggatgcatac	gttttcaccg	gccaaaatgt	ggattcccgg	cctttccgag	1140
ctgaataagc	cgctgctcca	ttttcatacc	cagtttaacc	gggacattcc	gtgggataaa	1200
atcgacatgg	atttcatgaa	tattaatcag	tetgeceacg	gcgaccgcga	atacggtttt	1260
atcggagcga	gattgggcat	tcctcgaaaa	gtaatcgccg	gatattggga	agacagagaa	1320
gtaaagcgct	cgatcgacaa	atggatgagc	gcagcggtcg	catatattga	aagccgccat	1380
atcaaagtcg	cccgatttgg	ggacaacatg	cggaatgtgg	cggtaacaga	aggagataag	1440

attgaa	gogo agattoagot tggotggtot gtogaoggat atggaatogg ogatotogto l	1500
<210> <211> <212> <213>	32	
<220> <223>	Primer	
<400> gactaa	39 gett cateeggega teagtttaat ge	32
<210> <211> <212> <213>	DNA	
<220> <223>	Primer	
<400> gactgaa	40 attc agatctgcgg ccgcacgcgt cgacagtact atttttttt gacagatttc	60
agaac		65
<210> <211> <212> <213>	37 DNA	
<220> <223>	Primer	
<400> gactgga	41 atcc agatctagtc gagtacaaag cggtggc	37
<210> <211> <212> <213>	DNA	
<220> <223>	Primer	
<400> gactgaa	42 attc gaccagccaa gctgaatctg c	31
<210><211><211><212><213>	4078	

<400> 43 tttccggcgt agcacccgaa gcgaacctat taatcgtcaa ggtgctcggc ggtgaagacg 60 gcagcgggga ttatgaatgg atcatcaacg ggatcaacta cgccgttgag caaaaagccg 120 acattatttc aatgtcgctc ggcggtcctg ccgacgttcc ggagttgaag gaagcggtga 180 caaacgccgt gaagagcgga gtgctcgtcg tctgcgccgc aggaaacgaa ggcgacggca 240 atgaccgtac agaggagtac tcataccctg ctgcatacaa cgaagtcatc gccgtcggat 300 ccgtgtcatt gacgcgtgag tcttccgaat tttcaaatgc gaacaaagaa attgaccttg 360 420 ttgcacctgg agaagaaatc ctctctacat tgcccgacca tcaatacgga aagctgacgg 480 gaacatcgat ggctacaccg cacgtcagcg gcgcgctcgc tctcatcaag tcagctgaag 540 aagaggegtt taaacggaaa ctgacagaac ccgaactgta tgctcagtta atccgccgca 600 cccttcctct tgattactca aaagcgctga tcggcaacgg attcttatat ttgtcagcgc 660 cggaggtact ggcggaaaaa gccggcgaag caaaacttct ttccctttaa cagtctaaag 720 gaggetgeeg acaatgtegg eggeettttt catggeeatg tataaagetg aatettttta 780 attgcaagaa ttcaaaaatt attttgacta aaagatcgcg gcggtatata atctactaaa caatttcatc gccgggaaca tggtaatcta acgaggttag attttaaaag ggaagtttgg 840 900 tgaaaatcca acgcggtccc gccactgtga atgaggaggt tatttcataa aacccactgt 960 ttctatatgg gaagggggaa ataaccgtcg attcatgagc caggagacct gcctgttctg 1020 acgcaccata aacctacggt cgataggagg tgttcgagtt gacgtaacaa tcgctacgtt 1080 tatttctcgt tcgcaacatg ctgttttcag gcattcacct tctcattgtc cgaagtgtga 1140 gtgtcttttt ttattgaaca ctaaaaggag gagaccagac atgactaatg taaaaacgag cagcttgggc tttccaagaa tcggcttgaa cagagaatgg aaaaaatcgc ttgaggctta 1200 ttggaaagga aacacggacc gcgagacctt tttgaaagaa atggatgaac aatttttagc 1260 1320 agegetecag acteagettg ateageaaat egatateata eeggttteeg aetttaeaat gtacgaccat gttcttgaca cggcggtgat gttcaactgg attccagatc gattcaagga 1380 tataaacgat ccgttagata cttatttcgc aatggcgaga ggcacgaaag atgctgtatc 1440 1500 gagtgaaatg acaaaatggt ttaatacaaa ctaccattat attgtgcctg aatatgaaaa 1560 aggtqcacaa taccqcqtqa cqaqaaacaa accqcttcaa gattaccaaa gaqcaaaaqc 1620 agcattggga acagaaacga agcccgtcat actcggcctt tacactttcg tagcccttgc aaaaggctat gaacaacagg atattaaaga tatttataac caaatgacac ctctttacat 1680

ccaggttttg aaagagcttg agcaggaagg cgtcaaatgg gtgcaaattg acgagcctgc 1740 tettgtgacg getteacetg aagaagegge tgetgteaaa gaaatetate agaegattae 1800 agaagaagtc tctgaactga acatccttct gcaaacctac tttgactcgg ttgatgctta 1860 tgaagagctg atatcgtttc ctgtcgcagg aattggtctt gattttgttc atgataaagg 1920 gaaaaacttc gaacacctga aagcgcacgg ttttcctaaa gacaaagtcc ttgccgccgg 1980 cattttagac ggacgcaaca tttggaaagc caatctcgaa gagcgcctcg acctgacgct 2040 tgaactgatc cagagagegg gtgttgaega agtetggatt cageetteaa acageetget 2100 tcatgtccct gtcgcaaaac acccgggcga acatcttgcc gacgatctct tgaacggttt 2160 atctttcgca aaagagaaac ttctggagct tacactgctg aagaacggac ttgtttccgg 2220 aaaagcggcc atccaagcgg aaatcgatga agcgcacgga caccttcaag atctcaaaca 2280 gtacggtgca gcgacaaatt cggcctttgc cgaagaaaga ggcaagctga ctgaggaaga 2340 ctttaaacgc ccgacagctt ttgaagaaag gctgcggatt caaaatgact ctctcggact 2400 tecectattg cegacaacaa egateggeag ettecegeag aeggeggatg tgeggagege 2460 2520 gcggcaaaaa tggcggaaaa aagaatggtc cgacgagcag tatgaagcat ttattcagga agaaacaaag aaatggattg atattcagga agatctcgga cttgacgttc tcgttcacgg 2580 agaattogaa oggacagaca tggttgagta tttoggogaa aagotoggag gattogoott 2640 tactaaatac gcctgggttc agtcatacgg ttcccgctgc gtccggccgc cggtcatcta 2700 cggagatgtc gagtttaaag agccgatgac ggtaaaagaa acggtttacg cccaatcctt 2760 2820 gacctcgaag aaagtcaagg gcatgctgac agggcctgtt accattttaa actggtcctt tgcccgctat gacctgccga gaaaagagat cgccttccaa atcgcctgcg ccctccgcaa 2880 2940 agaggttgaa gcgcttgaaa aagcaggaat tcaaatcatt caggtcgatg aacctgcctt gagagaaggc ctgccgctta aagaacggga ttgggacgag tatctcaaat gggctgcaga 3000 3060 agcgttcaga ctgtccactt catctgtgga agatacgacg caaatccata cgcatatgtg ctacagcaac titgaagata tcgtagacgc gatcgaagat citgacgcag acgtcattac 3120 gategageae ageagaagee aeggeggatt tettgattat etggaaeage accettacet 3180 gaaagggctt ggtcttggcg tatatgatat tcacagccct cgcgtccctt ccagcgatga 3240 aatgctcacg atcatagaag acgcgctgaa agtctgcccg gctgatcgct tctgggtaaa 3300 ccctgactgc ggtttaaaaa cgagacagcc agaggaaacg atcgcagcgc ttaagaatat 3360 ggttgaagca gccaaacaag caagaggcaa actggctcag actgtttaat ttcacaaaaa 3420

atccact	laca	aacgccgcct	gttcacacgg	geggetettt	teatggetee	agecetttt	3400	
aggccaa	aag	aaccgttata	caaggtatgt	ccgcccaaaa	aacattaaga	cttttgattc	3540	
attcgta	ecga	tttccttccg	tatccttttc	ttttaacata	tttgtagtag	atgatggaag	3600	
ggaagga	aaaa	tatgtagtga	ttgacgatgg	aatagcgtta	gaacgaaaaa	tcaagcgaaa	3660	
aatatat	cag	gaagacattc	actctcttca	gctatacgta	aaagatgtga	atgccgccat	3720	
tgatgag	gctg	aggcaggaaa	gttcttctat	tttaaaagca	caccaaacgt	atatcaacgg	3780	
atggcgc	cgga	caggcgcgcg	aaatgtatga	cgcgcttttg	gacgatctcg	accgggcgga	3840	
atcgcgc	cgtg	tatgacaagc	tgaggaccat	taaagagcag	gcggacgaag	aaattgaacg	3900	
gcttcag	gctg	aaagccgagg	agctgatatg	acgatccggc	tgaacatcaa	tgatctgcac	3960	
gccctcg	gccc	gccaatttcg	ttattcccac	cagcgaatca	gcgatttaat	acgccttttg	4020	
aaccgto	catt	ttcatggttc	ttttctccag	cgtgaaaaca	gcaaggaaca	tgcggcat	4078	
<210><211><211><212><213><223><223><400> <aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa< td=""><td>Prin 44 eccg 45 41 DNA</td><td>ificial Sequ mer agtttcacaa ificial Sequ</td><td>aaaatccact</td><td>acaaacgccg</td><td>CC</td><td></td><td>42</td></aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa<>	Prin 44 eccg 45 41 DNA	ificial Sequ mer agtttcacaa ificial Sequ	aaaatccact	acaaacgccg	CC		42	
<223>	Pri	mer						
<400> ttttttt		gcttatgccg	catgttcctt	gctgttttca	С		41	
<210> <211> <212> <213>	46 32 DNA Art:	ificial Seq	uence					
<220> <223>	Pri	mer						
<400>	<400> 46							

<210> 47 <211> 45 <212> DNA <213> Artificial Sequence	
<220> <223> Primer	
<400> 47 ttttttttt ccatcgcact gggatatcag ctcttcataa gcatc	45
<210> 48 <211> 3952 <212> DNA <213> Bacillus licheniformis	
<400> 48 tttatacgtt tccctctcgg caatcggagc ctacacgaca ccaagctacg agct	tgagcct 60
ggcgaataaa atggtgaagc tgtttatgct gatattggtg gcgcttttta aagt	ggaggg 120
atttgtcatc ggattaacga tcttaactat agtgatgact tcgatcaggt catt	gcgaac 180
gccttactta tggcctctcc tcccgttcaa tggaaaagcg ttttggcatg ttct	cgtgcg 240
cacgtccgtt ccagggggaa aagtcaggcc gagcatcgtt catccgagaa accg	sctccag 300
acagccgtga agccggcatt cgaagaggct tttccccggg gaaaagcctc tttt	tcaata 360
ategaattee ggtetttgag tacegatgee tttgtattea ttggeagaga tege	gactgc 420
ccggaggctg cagatgttgt tctgtcttct gatcggatag acgacataca gcat	ttcgcg 480
gccgtacggg tcaatcgttg acgaatgaag gaaaacctca gttcctctcc gcca	aaatct 540
cgtattcgcc ggagctgtaa taatctgccc ttcataaggc tcataaattc tctg	ttcata 600
atgcgcagcc ggctgataag gggcgtatac atcttcaggt gcatagccgg gagc	gggggt 660
gtagggataa cgatttggat acatatgata acctctttcc cacttcgttt tttg	gttttc 720
atcittaaga ttatattcag gtaaatgcct atttgtatgg gcgaaaatct cagc	ttttcg 780
gctctttttt tattgaatgg acgttgtgta tgcctatttc tatcaagcgc tgtt	ttctgt 840
tattctataa tcaatagaat ggattagttg tttagggaat catttccttt ataa	atcaag 900
aaaatttgga caaatggtgg tttagttttt aaaacgaaat gttataatac aaca	taagaa 960
togcactate atgaageegg aagatgeate gggeageaac eggagegeee ettg	cacctt 1020
tgtcgataga gaaagaggga atgacaattg tttttacacg gtactagcag acaa	aatgaa 1080
agagggcacc tcgaaatcgg cggtgtcgat gttctatcat tggcagaaag atacc	ggaaca 1140
cctctttatg tatacgatgt cgcgctgatt agagagcgcg cccgaaaatt ccaga	aaggca 1200

ttcaaggaag ccggtttaaa agcgcaggta gcgtatgcaa gcaaggcgtt ttcatcggtt 1260 gccatgattc agcttgccga acaagagggg ctgtctctgg atgtggtatc gggaggagag 1320 cttttcactg cgatcaaagc agggttccca gctgagcgga ttcattttca cggaaacaat 1380 aagageeetg aagaactage catggegetg gageateaaa teggetgeat egtgetegat 1440 aactttcacg agatcgccat tacagaagat ctttgcaagc gatcaggaca aactgtagac 1500 gttttgctca gaatcactcc gggagttgaa gcgcacacgc acgattatat tacgacgggg 1560 caggaagatt ccaaattcgg ttttgatctg cataatggac aggtcgaaca agccatcgaa 1620 caagtccgcc gctcgtctgc gtttaagctc ctcggcgtgc actgccacat cggttcgcaa 1680 atttttgata cggcaggatt tgtccttgca gcagacaaga ttttcgagaa gcttgcggaa 1740 tggcgggaga cttactcttt cattccggaa gtgctcaatc ttggcggggg cttcggcatc 1800 cgctatacaa aagacgacga gccgcttgca gctgatgttt atgttgaaaa aatcatcgag 1860 gcggtcaaag caaatgccga gcatttcggc tttgacatcc ctgagatttg gatcgaacca 1920 ggccggtctc tcgtcggtga tgcggggact acgctgtaca cgatcggttc tcaaaaagag 1980 2040 gtgccgggca ttcgcaaata tgtagccatc gacggcggca tgagcgataa tatcaggccg gcgctttatg aggcaaaata tgaagcagcc gtcgccaaca ggatgaacga tgcttgtcat 2100 gataccgcat caatcgcagg aaaatgctgc gaaagcggag atatgctgat ttgggatttg 2160 gaaatccccg aagttcgcga cggagatgtg ctcgccgttt tctgcaccgg tgcgtacggc 2220 tacagcatgg ccaacaacta caaccgcatt ccgcgcccgg ccgtcgtctt tgtcgaggac 2280 ggggaagege agetegteat teagagagag aegtatgagg atategteaa getggatetg 2340 ccgctgaaat cgaaagtcaa acaataaaaa aatggagatt ccctaagagg ggggtctcca 2400 tttttaattc aagcacgaaa aacacttccc ggtgatcggg aggtgttttt tgttaaaaag 2460 atcatgacat gcatagaaca gcgaccgggc tagttgtata taatattgtg aatttaacaa 2520 aaaatttaca aaggagatga taaaggcaat gaccagggtg aaaaggatga gatttgctga 2580 tttgttggat ttagaggcgg agtagatgaa accggccaaa gtatccctac tccaccgatt 2640 2700 gctccagtgc ctgaagcaat gtgttgattg taacacagta aatcgtttta cagcaataaa catttttgtg aatattttat tgattttggc tgtgatctca ttcccatatt ctgctgcggc 2760 ccatggcgca acacagtccg gcgatcaata ttcaagcttt gaagaattgg agcggaatga 2820 agatccagct tcttaccgaa ttacggagaa gaacgcaaga gtgccgatgc tcatcatggc 2880 catccatgga ggcggcatcg aacccggaac gagcgaaatc gccaatgaag tgtccaaaaa 2940

```
ctattccctg tacttgtttg aagggctgaa atcatcaggc aatacggacc ttcacattac
                                                                     3000
aagcacgcgt tttgacgagc cagcggcgct cgcaattact gcaagccacc agtatqtcat
                                                                     3060
gtcgctccac ggctattaca gtgaagaccg cgatattaaa gtaggcggca cagaccgcgc
                                                                     3120
taaaatcaga atattggttg atgagctgaa ccgctcgggg tttgccgctg aaatgctggg
                                                                     3180
gacagatgac aagtatgccg gaacccatcc gaataacatc gccaacaagt cgctttccgg
                                                                     3240
gctgagcatt cagcttgaaa tgagcacggg tttccgcaaa tctttattcg accqgtttac
                                                                     3300
actaaaagac agggcggcga cgcaaaacga aacgttttac cgatttacaa agctgctgac
                                                                     3360
agattttatt catgaaaact atgaagaaga cggaggggat ttcccctctq caaaaataaa
                                                                     3420
acaccccctt caagtgaaaa aaggaggtgt ttcggcggtt gtgttaaccg ttggactctg
                                                                     3480
aggtgccgcc gccggtgaat acggaaacga tggcgttcca caqagacaca aagaagtcga
                                                                     3540
teagtttttg aagaaagttt tgteettett cagaateeaa gaatttegtg attttateet
                                                                     3600
ttgctttgtc aagctggtct ccaacctggt tccagtcgat attaatattt ttcatgttat
                                                                     3660
taaataaaga tataagagag tttttctgat cttctgtgag tgtcacgcca agttcggaag
                                                                     3720
cagccgaatc aatcgttttc tccaattcct cttttgactc gggaactccg tttttcgaga
                                                                     3780
tttcttcctt gactttggcc atcagcgctg acgcgttttc actgccgatt ttctcgccaa
                                                                     3840
gctctgaagt ggtgacaagc tcttcattcg cgaccttttt cacatcttcg gaaatttttt
                                                                     3900
cgcccgaagt cgtttcatac gctttcatca atccggttaa agcggctgtg cc
                                                                     3952
       49
<21.0>
<211>
       6837
<212>
       DNA
<213>
       Plasmid pMOL1642
<220>
<221>
      misc_feature
<222>
       (669)..(669)
<223>
      n denotes an undetermined nucleotide
<400>
      49
```

agatttattg aataggtcat ttaagttgag catattagag gaggaaaatc ttggagaaat 360 atttgaagaa cccgaggatc catgctgtcc agactgtccg ctgtgtaaaa aataggaata 420 aaggggggtt gttattattt tactgatatg taaaatataa tttgtataag aaaatgagag 480 ggagaggaaa catgaagaag attgcaattg cggcgattac agcgacaagc qtgctqqctc 540 tcagcgcatg cagcggggga gattctgagg ttgttgcgga aacaaaagct ggaaatatta 600 caaaagaaga cetttatcaa acattaaaag acaatgccgg agcggacgca ctgaacatgc 660 ttgttcagna aaaagtactc gatgataaat acgatgtctc cgacaaagaa atcgacaaaa 720 agctgaacga gtacaaaaaa tcaatgggtg accagctcaa ccagctcatt gaccaaaaag 780 gcgaagactt cgtcaaagaa cagatcaaat acgaacttct gatgcaaaaa gccgcaaagg 840 ataacataaa agtaaccgat gatgacgtaa aagaatatta tgacggcctg aaaggcaaaa 900 tccacttaaq ccacattctt qtqaaaqaaa aqaaaacqqc tqaaqaaqtt qaqaaaaaqc 960 tgaaaaaagg cgaaaaattc gaagaccttg caaaagagta ttcggtaccc gggtctagag 1020 tcgacgcggc cgcaaccatt tgatcaaagc ttgcatgcct gcaggtcgat tcacaaaaaa 1080 taggcacacg aaaaacaagt taagggatgc agtttatgca tcccttaact tacttattaa 1140 ataatttata gctattgaaa agagataaga attgttcaaa gctaatattg tttaaatcgt 1200 caatteetge atgttttaag gaattgttaa attgattttt tgtaaatatt ttettgtatt 1260 ctttgttaac ccatttcata acgaaataat tatacttttg tttatctttg tgtgatattc 1320 ttgatttttt tctacttaat ctgataagtg agctattcac tttaggttta ggatgaaaat 1380 attctcttgg aaccatactt aatatagaaa tatcaacttc tgccattaaa agtaatgcca 1440 atgagegttt tgtatttaat aatettttag caaaccegta ttecaegatt aaataaatet 1500 cattagctat actatcaaaa acaattttgc gtattatatc cgtacttatg ttataaggta 1560 tattaccata tattttatag qattggtttt taggaaattt aaactgcaat atatccttgt 1620 ttaaaacttg gaaattatcg tgatcaacaa gtttattttc tgtagttttg cataatttat 1680 ggtctatttc aatggcagtt acgaaattac acctctttac taattcaagg gtaaaatggc 1740 cttttcctga gccgatttca aagatattat catgttcatt taatcttata tttgtcatta 1800 ttttatctat attatgtttt gaagtaataa agttttgact gtgttttata tttttctcgt 1860 tcattataac cctctttaat ttggttatat qaattttgct tattaacgat tcattataac 1920 cacttatttt ttgtttggtt gataatgaac tgtgctgatt acaaaaatac taaaaatgcc 1980 catatttttt cctccttata aaattagtat aattatagca cgagctctga taaatatgaa 2040

catgatgagt gatcgttaaa tttatactgc aatcggatgc gattattgaa taaaagatat 2100 gagagattta tctaatttct tttttcttgt aaaaaaagaa agttcttaaa ggttttatag 2160 ttttggtcgt agagcacacg gtttaacgac ttaattacga agtaaataag tctagtgtgt 2220 tagactttat gaaatctata tacgtttata tatatttatt atccggaggt gtagcatgtc 2280 tcattcaatt ttgagggttg ccagagttaa aggatcaagt aatacaaacg ggatacaaag 2340 acataatcaa agagagaata aaaactataa taataaagac ataaatcatg aggaaacata 2400 taaaaaattat gatttgatta acgcacaaaa tataaagtat aaagataaaa ttgatgaaac 2460 gattgatgag aattattcag ggaaacgtaa aattcggtca gatgcaattc gacatgtgga 2520 cggactggtt acaagtgata aagatttctt tgatgattta agcggagaag aaatagaacg 2580 attitttaaa gatagcitgg agtitciaga aaatgaatac ggtaaggaaa atatgcigta 2640 tgcgactgtc catctggatg aaagagtccc acatatgcac tttggttttg tccctttaac 2700 agaggacggg agattgtctg caaaagaaca gttaggcaac aagaaagact ttactcaatt 2760 acaagataga tttaatgagt atgtgaatga gaaaggttat gaacttgaaa gaggcacgtc 2820 caaagaggtt acagaacgag aacataaagc gatggatcag tacaagaaag atactgtatt 2880 tcataaacag gaactgcaag aagttaagga tgagttacag aaggcaaata agcagttaca 2940 gagtggaata gagcatatga ggtctacgaa accctttgat tatgaaaatg agcgtacagg 3000 tttgttctct ggacgtgaag agactggtag aaagatatta actgctgatg aatttgaacg 3060 cctgcaagaa acaatctctt ctgcagaacg gattgttgat gattacgaaa atattaagag 3120 cacagactat tacacagaaa atcaagaatt aaaaaaacgt agagagagtt tgaaagaagt 3180 agtgaataca tggaaagagg ggtatcacga aaaaagtaaa gaggttaata aattaaagcg 3240 agagaatgat agtttgaatg agcagttgaa tgtatcagag aaatttcaag ctagtacagt 3300 gactttatat cgtgctgcga gggcgaattt ccctgggttt gagaaagggt ttaataggct 3360 taaagagaaa ttctttaatg attccaaatt tgagcgtgtg ggacagttta tggatgttgt 3420 acaggataat gtccagaagg tcgatagaaa gcgtgagaaa cagcgtacag acgatttaga 3480 gatgtagagg tacttttatg ccgagaaaac tttttgcgtg tgacagtcct taaaatatac 3540 ttagagogta agogaaagta gtagogacag ctattaactt toggtttoaa agototagga 3600 tttttaatgg acgcagcgca tcacacgcaa aaaggaaatt ggaataaatg cgaaatttga 3660 gatgttaatt aaagaccttt ttgaggtctt tttttcttag atttttgggg ttatttaggg 3720 gagaaaacat aggggggtac tacgacctcc cccctaggtg tccattgtcc attgtccaaa 3780

caaataaata aatattgggt ttttaatgtt aaaaggttgt tttttatgtt aaagtgaaaa 3840 aaacagatgt tgggaggtac agtgatggtt gtagatagaa aagaagagaa aaaagttgct 3900 gttactttaa gacttacaac agaagaaaat gagatattaa atagaatcaa aqaaaaatat 3960 aatattagca aatcagatgc aaccggtatt ctaataaaaa aatatqcaaa qqaqqaatac 4020 ggtgcatttt aaacaaaaa agatagacag cactggcatg ctgcctatct atgactaaat 4080 tttgttaagt gtattagcac cgttattata tcatgagcga aaatgtaata aaagaaactg 4140 aaaacaagaa aaattcaaga ggacgtaatt ggacatttgt tttatatcca gaatcagcaa 4200 aagccgagtg gttagagtat ttaaaagagt tacacattca atttgtagtg tctccattac 4260 4320 atgataggga tactgataca gaaggtagga tgaaaaaaga gcattatcat attctagtga tgtatgaggg taataaatct tatgaacaga taaaaataat tacagaagaa ttgaatgcga 4380 ctattccgca gattgcagga agtgtgaaag gtcttgtgag atatatgctt cacatggacg 4440 atcctaataa atttaaatat caaaaagaag atatgatagt ttatggcggt gtagatgttg 4500 atgaattatt aaagaaaaca acaacagata gatataaatt aattaaagaa atgattgagt 4560 ttattgatga acaaggaatc gtagaattta agagtttaat ggattatgca atgaagttta 4620 aatttgatga ttggttcccg cttttatgtg ataactcggc gtatgttatt caagaatata 4680 taaaatcaaa toggtataaa totgacogat agattttgaa tttaggtgto acaagacact 4740 4800 cttttttcgc accagcgaaa actggtttaa gccgactgcg caaaagacat aatcgactct agaggatect tttagtecag etgattteae tttttgeatt etacaaactg cataacteat 4860 atgtaaatcg ctccttttta ggtggcacaa atgtgaggca ttttcqctct ttccggcaac 4920 4980 cacttccaag taaagtataa cacactatac tttatattca taaagtgtgt gctctgcgag gctgtcggca gtgccgacca aaaccataaa acctttaaga cctttcttt ttttacgaga 5040 aaaaagaaac aaaaaaacct gccctctgcc acctcagcaa aggggggttt tgctctcgtg 5100 ctcgtttaaa aatcagcaag ggacaggtag tattttttga gaagatcact caaaaaatct 5160 ccacctttaa acccttgcca atttttattt tgtccgtttt gtctagctta ccgaaagcca 5220 gactcagcaa gaataaaatt tttattgtct ttcggttttc tagtgtaacg gacaaaacca 5280 ctcaaaataa aaaagataca agagaggtct ctcgtatctt ttattcagca atcgcgcccg 5340 attgctgaac agattaataa tgagccgcgg atatcgatgc cttgtcagag agattcctga 5400 agagcggcag gataaggtat ttagaatgat taatgtgctg atcttaattt tattgatctc 5460 atcattcatt gagatttcct ttacggtgta aagaaaaagg atagctgccg atcgtattga 5520

```
5580
tccggcagct atccttttgt ttattagcat atccaagaag caccaataat aattaataag
atgaacagca ccacaagcag cgcaaagccg ccagcgaaac ctcctgcata accgtcgccc
                                                                     5640
                                                                     5700
atattgacac ctcctctgcc ccagtcgtta cattagtgta tgcacgaatg tcatgaaacg
attaggctat cgtccaaaag aaaagaaccg cctgaaaaaa tgacggttct tttctcattt
                                                                     5760
                                                                     5820
tctaaggttt tagtacagat aagctgcacc aacgatgatt aataaaatga acaacacgac
                                                                     5880
caataaagca aaaccgcttg agtatcctcc gctcatgtta ttgacctcga attctgatca
aatggttcag tgagagcgaa gcgaacactt gattttttaa ttttctatct tttataggtc
                                                                     5940
                                                                     6000
attagagtat acttatttgt cctataaact atttagcagc ataatagatt tattgaatag
gtcatttaag ttgagcatat tagaggagga aaatcttgga gaaatatttg aagaacccga
                                                                     6060
                                                                     6120
acgcgtgagt agttcaacaa acgggccagt ttgttgaaga ttagatgcta taattgttat
                                                                     6180
taaaaggatt gaaggatgct taggaagacg agttattaat agctgaataa gaacggtgct
                                                                     6240
ctccaaatat tcttatttag aaaagcaaat ctaaaattat ctgaaaaggg aatgagaata
gtgaatggac caataataat gactagagaa gaaagaatga agattgttca tgaaattaag
                                                                     6300
                                                                     6360
gaacgaatat tggataaata tggggatgat gttaaggcta ttggtgttta tggctctctt
                                                                     6420
ggtcgtcaga ctgatgggcc ctattcggat attgagatga tgtgtgtcat gtcaacagag
                                                                     6480
gaagcagagt tcagccatga atggacaacc ggtgagtgga aggtggaagt gaattttgat
                                                                     6540
agcgaagaga ttctactaga ttatgcatct caggtggaat cagattggcc gcttacacat
ggtcaatttt tctctatttt gccgatttat gattcaggtg gatacttaga gaaagtgtat
                                                                     6600
                                                                     6660
caaactgcta aatcggtaga agcccaaacg ttccacgatg cgatttgtgc ccttatcgta
                                                                     6720
gaagagctgt ttgaatatgc aggcaaatgg cgtaatattc gtgtgcaagg accgacaaca
tttctaccat ccttgactgt acaggtagca atggcaggtg ccatgttgat tggtctgcat
                                                                     6780
catcgcatct gttatacgac gagcgcttcg gtcttaactg aagcagttaa gcaatca
                                                                     6837
```

<sup>&</sup>lt;210> 50

<sup>&</sup>lt;211> 817

<sup>&</sup>lt;212> DNA

<sup>&</sup>lt;213> Artificial sequence

<sup>&</sup>lt;220>

<sup>&</sup>lt;223> Primer

<sup>&</sup>lt;400> 50
gaattccggc ccaacgatgg ctgatttccg ggttgacggc cggcggaacc aaggggtgat 60
cggtcggcgg aaatgaaggc ctgcggcgag tgcgggcctt ctgttttgag gattataatc 120

agagtatatt	gaaagtttcg	cgatcttttc	gtataattgt	tttaggcata	gtgcaatcga	180
taagcttgaa	ttcggaggcc	gttattatat	catgagcgaa	aatgtaataa	aagaaactga	240
aaacaagaaa	aattcaagag	gacgtaattg	gacatttgtt	ttatatccag	aatcagcaaa	300
agccgagtgg	ttagagtatt	taaaagagtt	acacattcaa	tttgtagtgt	ctccattaca	360
tgatagggat	actgatacag	aaggtaggat	gaaaaaagag	cattatcata	ttctagtgat	420
gtatgagggt	aataaatctt	atgaacagat	aaaaataatt	acagaagaat	tgaatgcgac	480
tattccgcag	attgcaggaa	gtgtgaaagg	tcttgtgaga	tatatgcttc	acatggacga	540
tcctaataaa	tttaaatatc	aaaaagaaga	tatgatagtt	tatggcggtg	tagatgttga	600
tgaattatta	aagaaaacaa	caacagatag	atataaatta	attaaagaaa	tgattgagtt	660
tattgatgaa	caaggaatcg	tagaatttaa	gagtttaatg	gattatgcaa	tgaagtttaa	720
atttgatgat	tggttcccgc	ttttatgtga	taactcggcg	tatgttattc	aagaatatat	780
aaaatcaaat	caatataaat	ctgaccgata	aggatice			81.7